

REMARKS

Claims 10-18 are pending. No amendment has been made.

Claim rejections – 35 U.S.C. §103

Applicants respectfully traverse the obviousness rejections of claims 10-18 over Tam et al. (US 6,969,553; “Tam”) or PCT publication WO 01/73173.

Applicants note that Tam is not a prior art reference. The present invention is a 371 national phase application of PCT/JP2004/018004 filed December 3, 2004, claiming priority to Japanese Applications No. 2004-092305 filed March 26, 2004 and to three other Japanese applications. Receipt of papers submitted under 35 U.S.C. 119(a)-(d) is acknowledged in the Office Action (paragraph 1). Because the subject matter of claims 10-18 is described in Japanese Applications No. 2004-092305, claims 10-18 have an effective filing date of March 26, 2004. The earliest reference date of Tam is its filing date, September 3, 2004, which is later than the effective filing date of claims 10-18. Therefore, Tam is not prior art against the claims.

Withdrawal of the obviousness rejection over Tam is requested.

The claimed invention relates to a high strength polyethylene multifilament that has a uniform stress distribution. Claim 10 recites a high strength polyethylene multifilament, wherein said multifilament has a stress Raman shift factor of not smaller than $-5.0\text{ cm}^{-1}/(\text{cN/dTex})$. When the stress Raman shift factor is smaller than $-5.0\text{ cm}^{-1}/(\text{cN/dTex})$, a possible stress distribution due to the concentration of stresses may result. See paragraph [0023] of the specification. The uniform stress distribution in the claimed polyethylene multifilament is achieved by reducing the speed difference between the pulled filaments and the speed of the cooling medium (paragraphs [0018]-[0019]).

WO 01/73173 discloses a polyethylene multi-filament yarn having greater than about 60% of a high strain orthorhombic crystalline component (page 2, lines 19-21). Applicants believe that a high rate of a high strain orthorhombic crystalline component in the polyethylene multi-filament yarn, such as described in WO 01/73173, does not necessarily lead to a small stress distribution. Further, the polyethylene multi-filament yarn of WO 01/73173 is obtained by decreasing the dimension of the spin gap between the spinneret and the quench bath to less than about 25 mm. See page 7, lines 1-6. Unlike WO 01/73173, the claimed invention is achieved by

reducing the accumulated speed difference between the pulled filaments and the speed of the cooling medium. Paragraph [0018] of the present specification. Specific methods for reducing the accumulated speed difference are discussed in paragraph [0019]. On the other hand, the accumulated speed difference in WO 01/73173 appears to be very large because the speed of the cooling medium in the quench bath of WO 01/73173 is zero due to the use of a long water washing bath for cooling (page 6, line 31 to page 7, line 1; Fig. 1). Therefore, there is no evidence that WO 01/73173 discloses the claimed polyethylene multifilament.

Claim 15 recites the high strength polyethylene multifilament according to claim 10, wherein CV which indicates a variation in the strengths of monofilaments constituting the high strength multifilament is not higher than 25%. WO 01/73173 fails to disclose a variation in the strength of monofilaments within the range specified in claim 15 or a means for reducing such a variation. The present invention discloses that uniform cooling conditions can be achieved through the use of a cylindrical bath (paragraph [0019]) and an orifice having holes circularly arranged (paragraph [0050]). Further, the individual feeding of an inert gas to each of the injected filament-like solutions makes uniform cooling conditions possible so that non-drawn filaments having uniform structures can be obtained. WO 01/73173 does not teach or suggest a means for creating uniform cooling conditions. Because the cooling conditions in the windward side and the leeward side are different in WO 01/73173, a polyethylene multifilament where the non-drawn filaments have uniform structures, as in the claimed inventions, can not be obtained according to the disclosures of WO 01/73173.

In summary, the claimed inventions would not have been obvious over WO 01/73173. Applicants respectfully request the withdrawal of the obviousness rejections of claims 10-18.

CONCLUSION

The Examiner is encouraged to contact the undersigned regarding any questions concerning this amendment. In the event that the filing of this paper is deemed not timely, applicants petition for an appropriate extension of time. The Commissioner is authorized to debit Deposit Account No. 11-0600 the petition fee and any other fees that may be required in relation to this paper.

Respectfully submitted,

KENYON & KENYON LLP

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By: /King L. Wong/
King L. Wong
Reg. No. 37,500

1500 K Street, N.W., Suite 700
Washington, D.C. 20005-1257
(202) 220-4200 (telephone)
(202) 220-4201 (facsimile)